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FARMERS' BULLETIN No. 1471

CANNING

FRUITS AND VEGETABLES AT HOME

THIS bulletin attempts to give in as simple form as possible the application of scientific principles to home canning of fruits and vegetables. Methods of canning are based on knowledge of the causes of food spoilage and ways of preventing it. Scientific research is constantly throwing new light on this subject, and the methods recommended in this bulletin are based on the most reliable information the department has been able to obtain.

This bulletin supersedes Farmers' Bulletin 1211, entitled "Home Canning of Fruits and Vegetables."

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CANNING FRUITS AND VEGETABLES AT HOME

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CANNING is a method of using heat and air-tight containers to preserve food as nearly as possible in the condition in which it would be served when freshly cooked. It is a desirable and economical method of preserving many foods, by means of which their use is distributed over seasons and in places where they are not available fresh. Canned foods thus add variety and make possible a better-balanced diet at all seasons, the value of which to health can not be measured in dollars and cents.

CAUSES OF FOOD SPOILAGE

Successful canning is based on an understanding of the two following important causes for the rapid spoilage of fresh foods and on a knowledge of the methods by which this spoilage may be prevented.

First, there are present in all fresh fruits and vegetables substances called "enzymes." These enzymes bring about the normal ripening of fruits and vegetables and, unless checked, the final decay of the product. Since heating is an essential step in canning and these enzymes are easily destroyed by heat, it is only necessary to avoid the changes they may bring about in the food between the time it is gathered and the time it is cooked. This is one reason for the emphasis upon canning fruits and vegetables as soon as possible after they have been gathered.

The second and more important cause of food spoilage is the action of three groups of minute organisms which are present in the air, soil, water, and, in fact, on everything. They are bacteria, yeasts, and molds. Yeasts and molds are easier to kill than bacteria and do not cause so much difficulty in canning. Many types of bacteria go through a spore phase in their life cycle, a form in which they are very difficult to kill. For this reason bacteria are the chief dangers to be considered in canning. If all microorganisms are killed and

the product is sealed steaming hot within a sterile air-tight container, the food is said to be sterilized. The application of heat to foods during canning in order to kill bacteria is called processing.

When unheated air comes in contact with food it spoils, not because of the air, but because of the bacteria, yeasts, and molds it contains. Therefore, it is not enough just to destroy the microorganisms, but after processing, the food must be protected from the air by a hermetical seal to be successfully canned.

TIMES AND TEMPERATURES REQUIRED FOR DESTROYING BACTERIA

In killing bacteria by heat in canning, both the degree of temperature and the length of time it is applied must be considered. A very high temperature may produce a sterile product that will keep well, but this may be at too great a sacrifice of flavor and texture. Therefore the temperature applied should ordinarily be the lowest necessary to accomplish the desired result, varying with the kinds of bacteria and with the acidity and other conditions of the juice. No growing or vegetative forms of bacteria will survive for any length of time at the temperature of boiling water (212° F.), but the spore form is killed at boiling temperature only by long-continued heating, especially if the fruit or vegetable being canned has juice that is nearly neutral or only very slightly acid. When the juices are acid, as in fruits and tomatoes, both the vegetative and spore forms of bacteria are killed more quickly at the temperature of boiling water. The bacteria that require long-continued heating at boiling temperature may be killed more quickly at higher temperatures, such as are obtained in a pressure cooker. The necessary time of heating varies with some organisms from 6 hours at boiling temperature (212°) to 30 minutes at 240°, the temperature obtained by steam under 10 pounds pressure.

The effectiveness of any given method of applying heat to kill bacteria is also influenced by the number present and the time necessary for the heat to reach every portion of the material being canned. This emphasizes the importance of thorough cleansing of the product before starting to can and the use of freshly gathered products free from decay. The distribution of heat throughout every portion of the material being canned depends upon a number of factors and can best be discussed under the detailed directions for different methods of packing and processing.

The types of organisms present vary with different foodstuffs and to a certain extent with geographical distribution. Since some of the most resistant forms of bacteria are present in the soil, any condition of growth that makes products more liable to soil contamination, as in the case of low-growing spinach, or that makes such contamination more difficult to remove, as in the case of the fuzzy string bean, increases the possibility of infection.

Since a number of cases of food poisoning have been directly traceable to botulism, the bacteria causing it have been studied in order to find the temperature and conditions necessary for destroying them. They will not grow in salt solutions where the percentage of salt is higher than 9 per cent. They are destroyed at boiling temperature if the solution is sufficiently acid. With nonacid vegetables and meats there is no assurance that they are killed at

the temperature of boiling water unless the material is heated for as long as six hours. The heating time may be decreased very much if a higher temperature is used. This is the reason for the recommendation that meats and nonacid vegetables be canned under pressure. Special precaution must be taken in those regions where previous outbreaks of botulism or special difficulties in canning have shown the soil to be heavily contaminated with these or other heat-resisting bacteria.

TYPES OF HOME CANNING

(At temperatures near 212° F.)

WATER-BATH CANNERS[1]

One of the most common methods of applying heat in home canning is by the use of the water bath. If water is boiled in an open vessel or in one on which the top is not clamped down, the temperature reached is never higher than the boiling point of water. All additional heat applied goes to changing the water to steam, and the water boils away. Therefore, the temperature of the contents of the can can not go higher than that of the surrounding water. The boiling point of water at any place depends upon the atmospheric pressure, which changes with the altitude. At sea level it is 212° F., and it decreases as the altitude increases. (Table 1.)

TABLE 1.—*Boiling point of water at different altitudes*[1]

Altitude	Temperature of water		Altitude	Temperature of water	
Feet	° *F.*	° *C.*	*Feet*	° *F.*	° *C.*
Sea level	212	100	5,225	202	94
1,025	210	99	6,304	200	93
2,063	208	98	7,381	198	92
3,115	206	97	8,481	196	91
4,169	204	95	9,031	195	90

[1] The directions for processing in boiling water (pp. 15 to 18) are based on the boiling point at altitudes of 1,000 feet or less. For altitudes above 1,000 feet the length of processing should be increased 20 per cent for each additional 1,000 feet.

A water-bath canner (fig. 1) may be made from a wash boiler, bucket, or any vessel that has a tight cover and is large enough to hold a convenient number of jars. It should be fitted with a rack to hold the jars away from the bottom of the utensil, thus protecting them from bumping or overheating and allowing full circulation of water under them. A wire basket answers this purpose and also makes it possible to lift a large number of jars in and out of the canner at one time. Such a basket can be made by a tinner at small cost or at home from wire-mesh fencing.

STEAMERS AND OVENS

Two other methods of applying heat in home canning are by the use of steamers (fig. 1) and ovens. In the steamer where the steam circulates but is not under pressure, the temperature surrounding the can will be the same as in the boiling-water bath. In oven canning the temperatures most often recommended range from 250° to

[1] The word "canner" is used in this bulletin for the vessel or apparatus in which cans or jars are processed.

275° F. With such external temperatures, the temperature of the contents of the jars approximates that obtained in the boiling-water bath or steamer. The use of higher oven temperatures is not practical because of the greater loss of liquid through evaporation from the unsealed jars. It is necessary that the jars be only partially sealed when processed in an oven, as otherwise the seal would be broken by accumulated steam. Sealed tin cans can not be used in oven canning for this reason.

These methods of canning—boiling-water bath, steamer, and oven, can be used successfully for processing fruits, tomatoes, and a few other products (pp. 15 to 19).

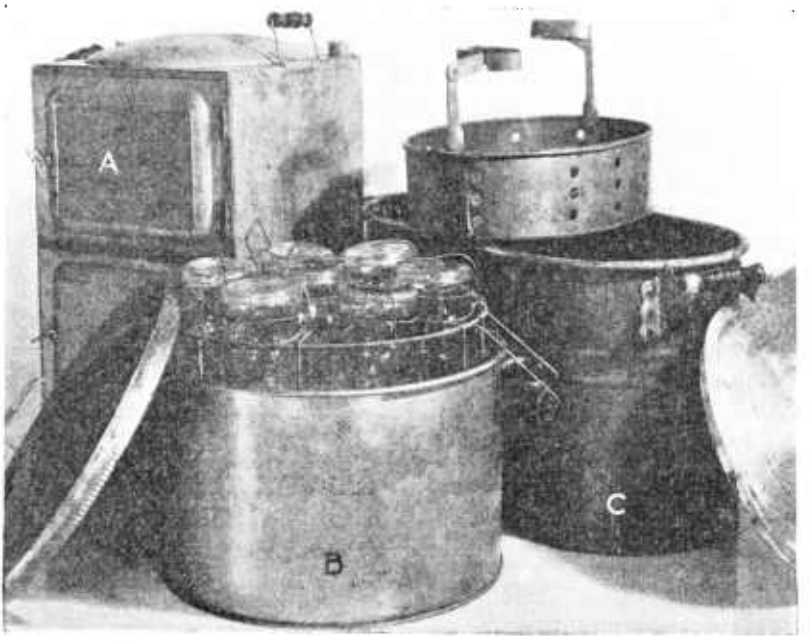

FIGURE 1.—Steamer and two typical water-bath canners: A, steamer; B, commercial canner; C, homemade canner

PRESSURE CANNERS

(At temperatures above 212° F.)

A pressure cooker (fig. 2) is a vessel specially designed for obtaining temperatures higher than can be reached in a water bath. It is impossible to heat water alone to a temperature higher than the boiling point at the particular altitude at which the test is made unless the vessel in which the water is heated is closed and the cover clamped down so that the steam is held in under pressure. Such vessels are known as pressure canners and pressure cookers.

A pressure canner should be strongly built, and the top should clamp on tightly so that there is no leakage of steam when closed. There must be an air outlet with a pet cock, and the top should also be equipped with a pressure gauge, a thermometer, and a safety valve. Since the temperature is a measure of the pressure, it is ordinarily assumed that one can be interpreted in terms of the

other. The pressure gauge, however, does not always indicate the actual temperature within the canner, and it is better to have both a gauge and a thermometer, for one then serves to check the accuracy of the other. The temperature reached in a pressure canner is in direct proportion to the steam pressure and is dependent upon the air having been completely removed. Ordinarily this is accomplished by allowing seven minutes to elapse after steam issues from the pet cock before it is closed, or it may be assured by never completely closing the pet cock.

In selecting a pressure canner the above requirements should all be carefully checked. Also in size it should be suited to the kind of containers and the probable number to be handled at one time. In

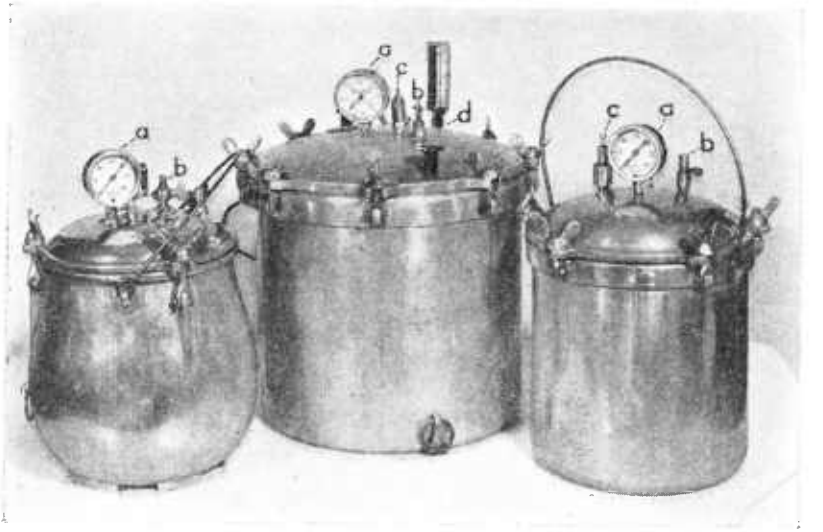

FIGURE 2.—Three pressure cookers which may be used in home canning: *a*, Pressure gauge; *b*, pet cock; *c*, safety valve; *d*, thermometer. The pet cock should not be closed until air has been completely removed

case the canner must be lifted on and off the stove during the canning it is also important that it should not be too heavy. The relationship between steam pressure and temperature is shown in Table 2.

TABLE 2.—*Steam pressure obtained in pressure canners and approximate corresponding degrees of temperature under standard conditions at sea level*[1]

Steam pressure	Temperature	
Pounds	° *F.*	° *C.*
5	228	109
10	240	115
15	250	121
20	259	126
25	267	131

[1] The reading of the pressure gauge is affected by altitude. For this reason it must be increased 1 pound for each 2,000 feet elevation in order to maintain the same relationship between temperature and pressure indicated in the above table. The pressures and times in the table for canning nonacid foods apply from sea level to 2,000 feet. Commencing with 2,000 feet add 1 pound for each 2,000 feet elevation. In case the cooker is equipped with a thermometer the pressure reading may be disregarded and the thermometer used as an indicator of the pressure.

CONTAINERS

Containers for canned products must be so constructed that they can be sealed air-tight to prevent the entrance of air which contains bacteria, yeasts, and molds.

GLASS JARS

The containers most used for home canning are glass jars. By the purchase of new rubbers, and in some cases new tops, they can be used repeatedly. The different types vary in size, shape, and method of sealing, as shown in Figure 3.

The Mason jar has a porcelain-lined metal screw cap. The difficulty experienced by many in cleaning this cap has led to the development of the modified form that has a glass, porcelain, or enameled metal top, held in place by a metal collar or ring which screws down over it. This collar should be made of a noncorroding metal, because if it corrodes it is difficult to remove. When these jars are removed from the canner the metal rings should be dried and carefully tightened before the jars are put away. The seal on this type of top is formed by a rubber ring or a special composition gasket.

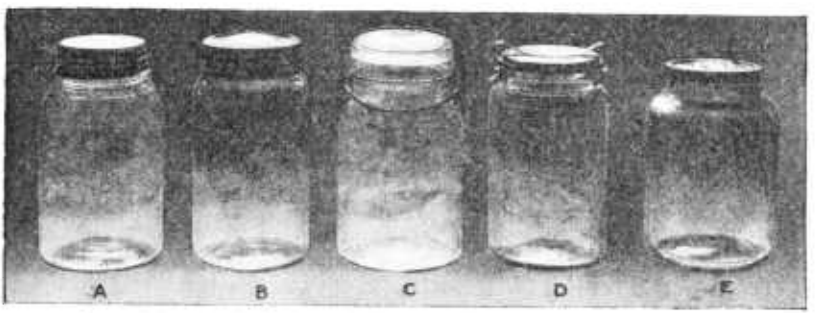

FIGURE 3.—Glass jars; A, Mason; B, modified Mason; C, wire-clamp glass-top jar; D, automatic seal; E, jar requiring special sealing device

In the wire-clamp glass-top jars the cover is a glass disk which fits down onto the rubber ring and is held in place by a wire clamp. This type of lid is very easily cleaned and sterilized, and if handled with care will last as long as the jar. The jar is easily sealed and can be opened with little difficulty, and only the rubber needs to be renewed each season.

The automatic seal jar has a lacquered metal top. Around the under surface of this is a groove filled with a hard, waxlike compound, which softens when heated and adheres to the glass. During the processing period the top is held in place by a metal spring or clamp which allows the air to escape, but holds the top to the jar, so that when the steam condenses no air is drawn in and a vacuum seal is formed. Also, as the jar cools the special compound hardens, making the seal more complete. A new lid is required each time the jar is used.

Another type of automatically sealed glass jar is being used, especially for products that are to be shipped. It is made of very heavy glass and is somewhat shorter and broader than the usual jar. The opening has approximately the same diameter as that of the

commoner types, and around the top is a heavy projecting rim over which the lid is clamped. The lid consists of a metal disk lacquered underneath, which fits inside of another metal cover. Around the edge of the inner disk is a groove, into which is fitted a gasket of rubber composition. The metal cap that fits over this disk comes down over the glass rim at the edge of the jar, and by means of a special sealing machine it is crimped around the edge and thus held securely in position. This outer metal cap prevents the seal from being broken during transportation. The lids must be renewed each season. This jar is especially adapted to steam-pressure canning, because it does not permit loss of steam or water during processing, as most glass jars do, unless they are very carefully handled.

RUBBER RINGS

An important factor in the successful use of glass jars is the rubber ring. These must be bought new each year and should be of good quality if they are to withstand the temperature of processing. The simplest test is to double the rings together and press the fold with the finger. The rubber should not crack under this treatment. They should also stretch to twice their length and return without change of shape.

TIN CANS

For commercial and to some extent for home canning tin containers are used. They have certain advantages over glass. There is no danger of breakage, either during canning or afterwards during storage and transportation, and they are easier to handle than glass when processing under pressure. Tin cans also heat through more quickly and may be plunged into cold water immediately after processing, which, of course, is impossible with glass jars. This rapid cooling checks the cooking and produces a more desirable product. The larger opening in the newer type of can makes it easier to pack some products in cans than in jars. At least two types of tin cans are in use at present.

The first type, the cap-and-hole can, is much like the old-fashioned wax-sealed kind, except that it is sealed with solder instead of with wax. The top is provided with a circular opening which is closed by soldering a tin disk over it with a capping steel. A small hole in the center of the disk allows the air and steam to escape during the exhaust. This hole must be closed by solder before the processing period begins.

The second type of tin can in general use, the sanitary or rim seal, is rapidly replacing all others. The top is entirely open and is sealed by a double seaming of the cover onto its edge. The part of the cover which comes in contact with the upper edge of the can is coated with a compound or fitted with a rubber composition film that makes a seal when the cover is crimped on. The can is sealed with a machine, several types of which are on the market. One of the simpler machines may be adjusted to handle No. 2, No. 2½, and No. 3 cans, and, if desired, can be obtained to fit other sizes. (Fig. 14.)

When tin cans are used, those with special enamel linings are recommended for canning certain products. Foods containing the

red anthocyan pigments lose their color when heated in contact with tin. To prevent this reaction, a special enamel lining, bright gold in appearance, called R or sanitary enamel, is used, and the original color is retained to a greater degree.

Cans with an enamel lining called C, which is dull gold in appearance, should be used for canning foods high in protein. A darkening both of the food and of the inside of the can takes place if these foods are canned in plain tin. This is due to the formation of metallic sulphide from the protein of the food during processing.

In the time-tables for fruit and vegetable canning, pages 18 and 22, recommendations are given for the type of can to be used with the various products.

METHODS OF CANNING

In the so-called open-kettle method the material is cooked directly in an open vessel as a means of killing the bacteria. This cooking takes the place of both precooking and processing in the other methods. The food is then filled into sterilized jars and sealed immediately. The temperature is not increased above the boiling point of water, except as it may be slightly raised by added sugar or soluble materials in the juices; therefore this method is suitable only for fruits and tomatoes. The food is heated through more evenly and quickly than when it is heated after packing in jars. The disadvantages of this method lie in the necessity for the sterilization of the jars before they are filled and in the danger of contamination during filling. Furthermore, there is always danger that air containing microorganisms will be incorporated when the jars are filled in this way. If they are sealed while boiling hot, however, this danger is in part avoided.

The term "cold pack" has been applied to the method in which material was packed cold into the container and then processed either in a water bath or a pressure canner. Fruits and vegetables needing to be peeled or softened in order to be packed to advantage were "blanched" in hot water or steam and then dipped into cold water. Sirup or brine was added, usually boiling hot, but even then the temperature of the food was considerably lower than boiling, when it was placed in the canner for processing. The chief disadvantage of this method is that when the material is packed cold a longer time is required for that at the center of the can to reach the temperature of the canner. This is especially true in the case of such vegetables as corn, that are thick and pasty, or those with mucilaginous juices, for these heat through very slowly. Some fruits, however, with a large proportion of added liquid may heat through quickly and be successfully packed by this method, but the shrinkage is sometimes greater than with other methods.

HOT-PACK METHOD

The advantages of the open-kettle method and any possible advantages of the cold-pack method of canning are combined in the hot pack. In this a short precooking of the material is substituted for the usually recommended blanching, and the cold dip is omitted. The theory that bacteria are killed by the shock of cold dipping has been proved to have no scientific basis. Precooking in this sense

means heating the material in a minimum quantity of liquid until it boils, the material is thoroughly wilted and shrunken so as to facilitate packing, and any inclosed air is driven out. The material is then filled into the container boiling hot and processed immediately. Containers so packed may be sealed without the usual exhaust, and the time required for the material to reach the temperature of the canner is decreased in containers of all sizes.

STEPS IN CANNING

Safe canning requires careful attention to every step in the process.

SELECTING AND PREPARING THE MATERIAL

Use only clean, fresh, sound fruits and vegetables in prime condition. "Two hours from garden to can" is a good rule. In any case, for the best results material should be canned the same day it is gathered. If it must be held, discard at once any showing bruises, decay, or other imperfections, and keep the remainder in a cool place in small lots adequately ventilated.

Be sure that the containers in which fruits and vegetables for canning are gathered and handled are clean. Any unnecessary infection at this stage increases the difficulty of processing and the chances of spoilage in the finished products.

Grade for size and same degree of ripeness if a uniform product is desired.

Wash the material thoroughly until every trace of soil is gone. The most dangerous bacteria and those most difficult to kill are in the soil. A wire basket is a help in washing, but should not be loaded too heavily. Always lift the material out of water rather than pour water off.

In case a bushel or more of peaches or apricots is to be canned at one time they may be peeled with the use of lye, but this method is not justified with a smaller quantity, except for a very firm peach which can not be peeled with the use of hot water. Be careful in using lye, especially if children are around, for it is a powerful caustic and serious accidents have happened.

To peel peaches or apricots with lye, prepare in an agateware or iron kettle, never aluminum, a solution of one-fourth pounds (4 ounces or about 4 level tablespoons) of granulated lye of a standard brand in 2 gallons of water. Heat to boiling, and while actively boiling immerse the peaches or apricots in a wire basket until the skin is loosened and partially dissolved. This will usually require 30 to 60 seconds. Remove the fruit, wash it at once in running water, if possible, until skin and lye are removed, and thoroughly rinse the fruit. If still water is used, rinse the fruit in a fresh supply after washing off skin and lye.

Fruit and tomatoes may be precooked or not as desired. (Figs. 5 and 6.) Nonacid vegetables should always be precooked (fig. 10) to remove air, to shrink them, to facilitate packing, and to make possible packing in the container at boiling temperature. (Figs. 11 and 13.)

While the material is being prepared the jars may be put in a water bath to boil. (Fig. 4.) This serves the double purpose of

cleansing the jars and of heating them, so that they may be filled with the hot material without any danger of breaking.

PACKING THE MATERIAL IN THE CONTAINERS

Pack the material in the jars or cans. If it has been precooked, work quickly so that it does not cool. The containers should be filled to within one-half inch of the top, with a sufficient proportion of liquid to solids to prevent a dense pack. There should be no air bubbles. In case there is not enough liquor in the precooked vegetables, add boiling water, and to all vegetables add the required quantity of salt. To fruits packed cold add boiling sirup.

SIRUPS USED IN CANNING

In canning fruits it is advisable to prepare in advance the sirup which will be needed. The degree of concentration of the sirup recommended for different fruits varies and is designated as thin, medium, and thick.

For thin sirup use 1 cup of sugar and 3 cups of water.

For medium sirup use 1 cup of sugar and 2 cups of water.

For thick sirup use 1 cup of sugar and 1 cup of water.

In each case the sugar and water are heated together and stirred carefully until the sugar is dissolved and the sirup brought to a boil. Fruit juice may be substituted for the water in the sirup with marked improvement in flavor.

ADJUSTING COVERS

Place rubbers in position on jars and adjust caps. (Fig. 7.) If the jars are filled with boiling-hot material they may be completely sealed before they are put into the water bath or steamer. For all processing in an oven or pressure canner (fig. 12), or if the material is not boiling hot when packed for processing in a water bath or steamer, the jars should be only partially sealed, according to the following directions: On the screw-top jar, screw the cap down evenly until it catches hold of the rubber ring. On the screw-band type of jar, screw the band on firmly. With the wire-clamp glass-top jar, screw the cap on evenly and raise the upper clamp in position to hold the lid in place, leaving the lower clamp loose until after processing. On the automatic-seal jar, fasten the cap with the metal spring or clamp.

Seal tin cans which have been packed hot before placing them in the canner. (Fig. 14.) When not packed boiling hot, tin cans should be exhausted before sealing, to remove the air. If cap-and-hole cans are used, adjust and seal the caps, but do not seal the holes until after exhausting. Lids should not be adjusted on sanitary cans until after exhausting.

EXHAUSTING

The air should be removed as completely as possible from the material being canned before it is sealed in the container. This step is called "exhausting." In the case of glass jars packed with food below boiling temperature, exhausting is done during processing, since they are not sealed air-tight when placed in the canner. There are special devices on the market to exhaust glass jars before

sealing. However, since they are normally exhausted as a part of the heating process, it seems questionable whether the extra effort is justified. In tin cans and glass jars packed boiling hot the head

FIGURE 4.—Make the sirup and put the jars on to boil while the fruit is being prepared

FIGURE 5.—Pack the fruit in the jars and cover with boiling sirup

FIGURE 6.—Precook the fruit and fill it into the jars boiling hot

FIGURE 7.—Place the rubbers in position and adjust the caps

FIGURE 8.—Process for the time indicated in the table (p. 18). If not sealed before processing, seal spring caps before removal from the water bath by pushing down the lower wire. Tighten screw-cap jars immediately on removal from the water bath

FIGURE 9.—Allow the jars to cool quickly to room temperature in a place protected from drafts, then invert for a short time to test the seal. Keep them under observation for at least a week

space is filled with steam and further exhaust is unnecessary. Heat all other tin cans in water or steam bath until steaming hot in order to drive out air: then seal immediately.

PROCESSING

Heating material to kill the bacteria is called "processing." Process at the temperature and for the time indicated in tables on pages 18 and 22. Observe from the following those directions which apply to the method of canning used.

WITH THE WATER-BATH CANNER

Be sure that the jars or cans are far enough apart and that the rack on which they are supported is so arranged that the water can circulate freely under and around them.

FIGURE 10.—Prepare the vegetable as for cooking and precook as directed (pp. 20 to 21). If glass jars are to be used, put them in pan to boil

FIGURE 11.—Fill the jars with the vegetable boiling hot

FIGURE 12.—Place rubbers in position, adjust caps, and partially seal while boiling hot

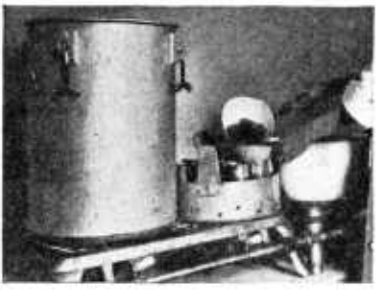

FIGURE 13.—Fill the tin with the boiling hot vegetable

Have the water in the canner boiling before putting in any jars or cans. The glass jars must be hot either from preheating in water or from filling with hot material in order to prevent breakage.

When all the containers are in the canner, see that the level of the water comes over the tops.

Count time as soon as the water begins to boil vigorously. (Fig. 8.)

As soon as the processing time is up remove the jars or cans from the water. If the jars were not sealed completely before processing, seal wire-clamp jars before removal from the canner and all other jars immediately afterwards. Place glass jars so that they will cool quickly to room temperature. (Fig. 9.) Plunge tin cans at once in cold water.

WITH THE STEAMER

Place the jars or cans far enough apart so that the steam will circulate freely among them. The water should be kept rapidly boiling so that sufficient live steam is circulated. Count the time as soon as the containers are placed in the steamer in circulating steam and process for the same period as that used for the boiling

FIGURE 14.—Seal the cans immediately while the head space is filled with steam, then place the filled containers in the pressure canner

FIGURE 15.—Adjust the cover, but do not close the petcock until steam has escaped for at least seven minutes. Bring the pressure quickly to the desired point and keep it there for the time indicated in the table (p. 22)

FIGURE 16.—If glass jars are used, open the canner cautiously. Allow jars to cool quickly to room temperature in a place protected from drafts, then invert for a short time to test the seal. Keep them under observation for at least a week

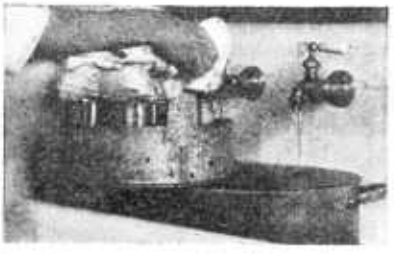

FIGURE 17.—If tin cans are used, the canner may be opened more quickly. Plunge the cans into cold water immediately after removal from the canner. No. 3 and No. 10 cans should be left in pressure canner until pressure reaches zero

water bath. Remove the containers from the steamer at the end of the processing period and treat in the same manner as those removed from the water-bath canner.

WITH THE OVEN

The temperature of the oven should be from 250° to 275°, preferably 275° F. Arrange the jars far enough apart to allow for the free circulation of the air around them. Count the time as soon as the jars are placed in the oven and process for a period 50 per cent longer than that used for the boiling water bath. At the end of the processing period remove from the oven and complete the seal on the jars.

A shallow container placed in the bottom of the oven under the jars will catch any juices that may boil out of the jars during the processing period.

WITH THE STEAM-PRESSURE CANNER

Pour boiling water into the canner until the level is just below the rack that holds the jars. Be sure that there is enough to prevent boiling dry during processing.

When the canner has been filled, adjust the cover and fasten securely. In case the cover is fastened by several clamps fasten moderately tight those opposite each other, one pair at a time; then go back over the whole set and tighten each pair. (Fig. 15.)

See that no steam escapes anywhere except at the pet cock.

Allow the pet cock to remain open until steam escapes from it in a steady stream for seven minutes, indicating that no air remains inside.

Then close the pet cock so that only a trace of steam can escape. Some persons prefer to close the pet cock entirely, particularly with small canners in which a great loss of steam is to be avoided because of the danger of boiling dry.

Allow the pressure to rise until the gauge registers the pressure that indicates the desired temperature.

Count time from the moment the desired temperature and pressure are reached.

Maintain a uniform pressure during the processing period by regulating carefully the source of heat. Fluctuations in pressure, as from 10 pounds to 15 pounds and down again, are to be avoided in any case, and when canning in glass may result in loss of liquid. A sudden drop in pressure through cooling or release of steam may also cause this. It is especially important to avoid having the pressure go so high that the safety valve releases the steam suddenly, nor should the steam be allowed to escape suddenly by opening the pet cock.

At the end of the processing period remove the canner from the fire and proceed according to the following directions adapted to jars or cans:

When using glass jars or No. 3 or No. 10 tin cans, allow the canner to cool until the steam gauge registers zero before opening the pet cock, and then open gradually. (Fig. 16.) This is to prevent too sudden a drop in pressure which would cause the liquid to blow out of the jars. Allow the jars to cool as quickly as possible to room temperature away from drafts, but with the air circulating freely around them. Then invert for a short time to test the seal.

If tin cans smaller than No. 3 and No. 10 are used, open the pet cock wide at once and allow the steam to escape rapidly. Remove the cans from the canner and plunge them into cold running water if possible (fig. 17), or if this is not available change the water as soon as it becomes warm. The more rapidly the cans are cooled the less danger there is of overcooking the product. Watch carefully for air bubbles that indicate imperfect sealing. Leakers should be opened, the contents heated and repacked in other cans, and processed again as at first.

CHECKING UP RESULTS

Mark all canned products so that those in each batch can be distinguished. Examine the inverted glass jars for signs of leakage. Hold canned products at room temperature for a week or 10 days, where they can be examined at least once a day to be sure that they are keeping. If the contents of any jars or cans show signs of spoilage, examine all of that lot carefully. After this observation period, store the canned goods in a cool place. A short storage at rather high temperature serves to bring out quickly defects that might not be noticed if the products were stored at a lower temperature. Results can thus be checked up and methods improved.

EXAMINATION OF CANNED FOOD BEFORE USE

All foods should be inspected before their preparation for the table. Canned food is no exception to this rule. Spoilage in canned food is due to either understerilization or improper sealing. If the directions given in this bulletin are followed, spoilage should not occur. Nevertheless, it is recommended that samples from each lot be held in a warm place for a period after canning to determine whether or not the product is keeping before it is stored away.

An inspection of the can or jar before opening is desirable and leaky cans or jars, or those which give evidence of spoilage should be discarded. In tin cans both ends should be flat and curved slightly inward. Neither end should bulge or snap back when pressed. All seams should be tight and clean, with no traces of leaks. In glass jars there should be no bulging of the rubber and no signs of leakage.

When the can is opened there should not be any sudden outburst of air or spurting of liquid. The odor should be characteristic of the product. Any different odor probably indicates spoilage. The inside of the can should be smooth and clean or well lacquered and not markedly corroded. In products which contain an appreciable amount of protein, such as meat and sea food, and many vegetables like peas and corn, hydrogen sulphide is formed from the protein by the heat of processing. This blackens the interior of an unenameled can in the same way that a silver spoon is blackened when left in contact with a cooked egg. This sulphide formation should not be mistaken for corrosion. The appearance is normal with these foods and does not interfere with the wholesomeness of the product.

The contents of the container should always be given the same careful examination to which all foods should be subjected before eating. If there is any evidence of spoilage the product should be discarded.

Never taste to discover spoilage. When spoilage has occurred in nonacid foods there is always the possibility that even a taste may cause serious illness. For this reason it is good practice to boil all canned nonacid vegetables before using them.

DIRECTIONS FOR PREPARING AND PROCESSING FRUITS, TOMATOES, PICKLED BEETS, AND RIPE PIMIENTOS

The times given for processing in boiling water apply only to places with altitudes of 1,000 feet or less. For all altitudes above

1,000 feet the time should be increased 20 per cent for each additional 1,000 feet. When processing in the steamer use the time given for the boiling-water bath, but for the oven canning increase the time by 50 per cent. The same correction for altitude should be made for the steamer and oven as for the boiling water bath.

When half-gallon glass jars are used, five minutes should be added to times given for pint and quart glass jars.

Apples.—Apples should be pared and cut into the sizes desired. If the pieces must stand, place them in a mild salt solution (one-fourth cup salt to 1 gallon water) to prevent them from turning dark. They may be packed directly into jars and covered with boiling-hot thin sirup. Process quart and pint glass jars for 15 minutes in boiling water and No. 2 and No. 3 tin cans for 10 minutes.

Apples packed raw shrink in canning so that the containers are not full. This can be prevented if they are boiled for five minutes in the sirup before packing. In this case fill into the cans hot, cover with sirup boiling hot, and process containers of all sizes for five minutes in boiling water.

Apples may also be baked as for serving, adding sugar to taste and water if necessary. Pack hot in the containers, cover with hot sirup, and process containers of all sizes for five minutes in boiling water.

Windfall or green apples may be made into sauce. Pack boiling hot and process immediately containers of all sizes for five minutes in boiling water.

Apricots.—Same as peaches.

Berries.—Gather the berries in shallow vessels so as to prevent crushing, and can them as soon as possible after gathering. Sort the fruit and use the smaller and any imperfect berries for the preparation of juice to use in making a sirup of medium sweetness. Wash carefully and remove caps and stems. Pack the fruit in containers, pressing it gently into place; cover with the prepared medium sirup boiling hot. Process quart and pint glass jars for 20 minutes in boiling water, and No. 2 and No. 3 sanitary, or R enameled tin cans for 15 minutes.

Some berries shrink so much during processing that the containers are not well filled and the berries tend to float. This can be prevented by precooking the berries before filling the containers. To each pound of berries add one-fourth to one-half pound of sugar, according to the sweetness of the fruit. Place in a kettle and heat to boiling, stirring gently, and boil for three to four minutes. Pack boiling hot and process immediately containers of all sizes for five minutes in boiling water.

Cherries.—Cherries may be canned pitted or unpitted, depending upon personal taste and the way in which they are to be served. If used unpitted they should be pricked to prevent shrinkage. They may be packed in hot containers and covered with boiling sirup, using thick sirup for sour cherries and medium for sweet. A better flavor will be obtained if the sirup is made from the juice which collects on pitting the cherries. Process quart and pint glass jars for 25 minutes in boiling water, and No. 2 and No. 3 sanitary, or R enameled tin cans, for 20 minutes.

When pitted cherries are used, they may be precooked by boiling for five minutes with sugar to taste. In this case fill into the containers boiling hot and process immediately containers of all sizes for five minutes in boiling water.

Currants.—Same as berries.

Figs.—Figs are ordinarily preferred in a richer sirup than is usual for canning. For this reason they are more nearly a preserved than a canned product. Sprinkle 1 cup of soda over 6 quarts of sound, firm figs, and add 1 gallon of boiling water. Allow the figs to stand in this soda bath for five minutes. Drain and rinse thoroughly. Bring 2 quarts of medium sirup to the boiling point and add the well-drained figs. Allow the fruit to boil in this sirup for one hour. Remove the fruit carefully, pack in hot containers, fill with boiling hot sirup, and process immediately containers of all sizes for five minutes in boiling water.

Gooseberries.—Use the method suggested for berries packed raw, substituting a thick for a medium sirup. Process quart and pint glass jars for 20 minutes in boiling water and No. 2 and No. 3 sanitary or R enameled tins for 15 minutes.

Or, if desired, prepare a sauce by adding a small quantity of water to the berries after they have been sorted and washed, and boiling until the fruit is cooked to a pulp. To each quart of this pulp add one-half cup of sugar or more if preferred. Heat until the sugar is dissolved, and while boiling hot pack in jars. Process containers of all sizes for five minutes in boiling water.

Peaches.—Make a thin or medium sirup as desired. Put in one cracked peach pit for every quart of sirup. Boil for five minutes and strain.

Immerse the peaches in boiling water for about one minute or until the skins will slip easily, plunge at once into cold water for a few seconds; remove the skins, cut the peaches into halves, and discard the pits. Some varieties of firm clingstone peaches require the lye-solution method for peeling (p. 9). Peaches may be packed raw, but a better pack is obtained if the fruit is first simmered four to eight minutes. Do not cook until soft. Pack at once, placing the halves pit side down in overlapping layers. Fill up the containers with hot sirup. Process all containers for 15 minutes in boiling water.

Pears.—Peel, cut in halves, core, and cook in boiling medium sirup for four to eight minutes, according to the size of the fruit. This precooking makes hard varieties of pears pack better. Pack the pears hot into containers and fill them up with boiling sirup. Process containers of all sizes for 20 minutes in boiling water.

Pineapples.—Peel and core, remove all eyes carefully. Cut into convenient cross sections, pack into the containers, and fill up with thin boiling sirup. Process quart and pint glass jars for 30 minutes in boiling water and No. 2 and No. 3 tin cans for 25 minutes.

Plums.—Plums are ordinarily canned whole, and they should be gathered just as they are commencing to ripen. After they are washed prick each plum to prevent the skin from bursting. Fill into jars and cover with boiling medium sirup. Process quart and pint glass jars for 20 minutes in boiling water and No. 2 and No. 3 sanitary or R enameled tin cans for 15 minutes.

Or, if preferred, prepare sauce by cooking the plums with sugar to taste until the sugar has dissolved. The pits and skins may be strained out or not as desired. Fill the containers boiling hot, and process all sizes for five minutes in boiling water.

Rhubarb.—Select young, tender stalks, trim, wash, and cut into half-inch lengths. Boil in a thick sirup until soft. Or add one-fourth as much sugar as rhubarb by measure, and bake until tender in a covered dish. For use in pies, precook in a little water without sugar. Pack boiling hot. Process quart and pint glass jars for five minutes in boiling water. Since rhubarb corrodes tin cans, it is better for home use to pack it in glass.

Strawberries.—Strawberries contain so much water that the canned product is not very attractive. They are ordinarily more palatable if preserved. The following method is recommended in case they are to be canned: To each quart of berries add 1 cup of sugar. Bring slowly to boiling and let stand overnight in the kettle. In the morning reheat the mixture to boiling, fill into the containers hot, and process all sizes for five minutes in boiling water. If canning in tin use sanitary or R enameled cans.

Tomatoes.—Select firm, ripe tomatoes of medium size and uniform shape, free from spots and decay. Put into trays or shallow layers in wire baskets and dip in boiling water for about a minute, according to ripeness. Remove and plunge quickly into cold water for an instant. Drain and core and peel promptly. Pack into jars or cans as closely as possible. For home use, fill with a thick tomato sauce or with the juice of other tomatoes; but if the tomatoes are to be sold under Federal regulations add only the juice which drains from them during peeling and trimming. Season with 1 teaspoon of salt per quart. Process quart and pint glass jars for 45 minutes in boiling water and No. 2 and No. 3 sanitary or R enameled tin cans for 35 minutes. Or cut in quarters, heat just to boiling, and pack hot. Process all sizes five minutes in boiling water.

Tomato juice.—Select firm, ripe tomatoes, wash, and cut into small pieces. Simmer in small quantities at a time until just soft enough to put through a fine sieve. If canning in glass, bring the juice just to boiling, pour into sterilized jars, and seal. No processing is necessary. If canning in tin, heat the juice to simmering, pour into cans, seal, and process for five minutes in boiling water. Cool in running water. Avoid delay at any stage of the process. Avoid head space in either tin or glass containers.

Pickled beets.—Select beets of uniform size, cut off the stems, allowing at least 1 inch to remain on the beets so that they will not bleed and lose color and sweetness. Wash them well and cook in a covered pan until tender, in enough water to cover. For young beets this will require about one-half hour. When tender plunge into cold water, remove the skins, and when cool cut in dice or thin slices. Fill the beets into jars and to each pint add one-half teaspoon of salt. Fill up the jars with a mixture of vinegar and brown sugar in equal proportions by measure, heated to boiling, so that the sugar is thoroughly dissolved. If this is too acid the vinegar may be diluted one-fourth with water. Process immediately in pint or quart glass jars for 30 minutes in boiling water. Pickled beets may be processed in the water bath because of the high percentage of acid.

Ripe pimientos.—The fruit of these peppers has very thick flesh, tough skin, and is comparatively smooth and free from ridges. They should be ripe, sound, and free from bruises. Use only whole peppers. The skin separates if they are exposed to dry heat, as in roasting, or if immersed in hot cooking oil. To accomplish this, they may be dipped in hot cooking oil (290° F.) for two or three minutes, or placed in a hot oven (450° F.) for six or eight minutes. Cool quickly by dipping in cold water. The skins should then come off readily. The peppers so obtained are soft and pliable and can be folded into the cans after removing stems and seed cores. No liquid is added, since the processing brings out a thick liquor which almost covers them in the can. Add one-half teaspoon of salt to each pint. Process pint glass jars for 40 minutes in boiling water and No. 1 and No. 0 sanitary or R enameled tin cans for 30 minutes.

TIME-TABLE FOR CANNING FRUITS, TOMATOES, PICKLED BEETS, AND RIPE PIMIENTOS

The times given for processing in boiling water apply only to places with altitudes of 1,000 feet or less. For all altitudes above 1,000 feet the time should be increased 20 per cent for each additional 1,000 feet.

When half-gallon glass jars are used, add five minutes to times given for pint and quart glass jars.

Product	Method of treatment before processing	Processing period in boiling water		Type of tin can
		Pint and quart glass jars	No. 2 and No. 3 tin cans	
		Minutes	*Minutes*	
Apples	Slice, quarter, or halve, then pack in containers and cover with boiling sirup.	15	10	Plain tin.
	Or boil whole in sirup, or bake as for serving, and cover with sirup, and pack hot.	5	5	Do.
	Or pack hot in form of apple sauce	5	5	Do.
Apricots	Same as peaches.			
Blackberries, Blueberries, Dewberries, Huckleberries, Logan blackberries, Raspberries	Pack in containers. Fill with boiling hot, medium sirup.	20	15	Sanitary enamel.
	Or precook and pack hot	5	5	Do.
Cherries	Pack in containers, cover with boiling sirup, using thick sirup for sour cherries, and medium for sweet.	25	20	Do.
	Or remove pits, add sugar as desired, bring to boil, and pack.	5	5	Do.
Currants	Same as berries.			

Product	Method of treating before processing	Processing period in boiling water		Type of tin can
		Pint and quart glass jars	No. 2 and No. 3 tin cans	
		Minutes	*Minutes*	
Figs	Sprinkle 1 cup of soda over 6 quarts of figs. Add 1 gallon of boiling water. Allow figs to stand in this five minutes. Drain and rinse well. Add 2 quarts boiling medium sirup. Boil for one hour. Fill in containers. Cover with hot sirup.	5	5	Plain tin.
Gooseberries	Pack in containers. Fill with boiling hot, thick sirup.	20	15	Sanitary enamel.
	Or prepare sauce, using sugar as desired. Fill hot.	5	5	Do.
Peaches	Scald, dip into cold water, and peel. Lye-peel or hand-peel firm clingstones. Cut into size desired, removing pits. Precook. Fill containers, then add sirup of desired consistency, in which one cracked peach pit for every quart of sirup has been boiled.	15	15	Plain tin.
Pears	Pare and cook for four to eight minutes in boiling medium sirup. Pack hot in containers and fill with the boiling sirup.	20	20	Do.
Pineapples	Peel, core, remove eyes. Cut into convenient cross sections. Pack in containers. Fill with boiling thin sirup.	30	25	Do.
Plums	Prick. Fill in containers. Cover with boiling medium sirup.	20	15	Sanitary enamel.
	Or bring to boil, using sugar as desired. Fill hot into containers.	5	5	Do.
Rhubarb	Cut in half-inch lengths. Add one-fourth as much sugar as rhubarb by measure. Bake until tender in covered baking dish. Or cook until soft in boiling sirup. Pack in hot containers.	5	5	Do.
Strawberries	To each quart add 1 cup of sugar. Bring slowly to boiling. Let stand overnight in the kettle. Reheat to boiling. Fill containers hot.	5	5	Do.
Tomatoes	Scald and peel. Pack whole. Cover with hot tomato juice. Add 1 teaspoon salt to each quart.	45	35	Plain tin or sanitary enamel.
	Or cut in quarters, heat just to boiling, and pack hot.	5	5	Do.
Tomato juice	Select firm, ripe tomatoes. Wash well and drain. Cut into sections. Simmer in small quantities at a time until just soft enough to put through a fine sieve. Bring to boiling, pour into sterilized jars, and seal. Or heat to simmering, pour into tin cans, seal, and process.	5	5	Both plain tin and sanitary enamel used. Plain tin preferred.
Pickled beets	Precook, peel, and slice in containers. Cover with mixture of vinegar and sugar, boiling hot.	30	----------	----------
Ripe pimientos	Heat in hot fat or oven to loosen peel. Peel and pack in small containers. Add one-half teaspoon salt to each pint.	[1] 40	[2] 30	Sanitary enamel.

[1] For pint glass jars.
[2] For No. 1 and No. 0 cans.

DIRECTIONS FOR PREPARING AND PROCESSING NONACID VEGETABLES

Process all these vegetables in the pressure canner. If no pressure canner is available, it is recommended that methods of preservation other than canning be used.

Asparagus.—Asparagus for canning must be fresh and tender. Pick over carefully, discard any imperfect pieces, sort according to size, and wash thoroughly. Tie in uniform bundles, place in a saucepan, with boiling water over the tough portion only, cover tightly, and boil for two to three minutes; or cut in half-inch lengths, add enough water to cover, and boil for two minutes in an uncovered vessel. Pack boiling hot into containers, cover with the water in which boiled, and add 1 teaspoon of salt to each quart. Process immediately at 10 pounds pressure, or 240° F., quart glass jars for 35 minutes, pint glass jars for 30 minutes, and No. 2 and No. 3 tin cans for 30 minutes.

String beans.—Pick over carefully, string, wash thoroughly, and cut into pieces of desired size. Add enough boiling water to cover and boil for five minutes in an uncovered vessel. Pack in containers boiling hot, cover with the water in which boiled, and add 1 teaspoon of salt to each quart. Process immediately at 10 pounds pressure, or 240° F., quart glass jars for 35 minutes, pint glass jars for 30 minutes, and No. 2 and No. 3 plain tin or C enameled tin cans for 30 minutes.

Lima beans.—Only young and tender Lima beans should be canned. The older ones may be dried successfully. For the young, tender ones use the method suggested for peas. Process the hot-packed beans immediately at 10 pounds pressure, or 240° F., in quart glass jars for 55 minutes, pint glass jars for 50 minutes, and No. 2 and No. 3 C enameled tin cans for 50 minutes.

Baby beets.—Only young, tender beets should be canned, and the turnip-shaped varieties make a more attractive product. Wash thoroughly and scald in boiling water or steam for about 15 minutes until the skins slip easily. Leave on at least 1 inch of the stems and all of the roots during this cooking to prevent bleeding. Slip off the skins, fill into the containers, add 1 teaspoon of salt to each quart, and fill with hot water. Process immediately at 10 pounds pressure, or 240° F., quart glass jars for 35 minutes, pint glass jars for 30 minutes and No. 2 and No. 3 sanitary or R enameled tin cans for 30 minutes.

Pickled beets may be processed in the water-bath canner (p. 18).

Corn.—The garden varieties of corn are the best for canning. They should be gathered about 17 to 25 days after silking, the exact time depending upon variety and season. Shuck, silk, and clean carefully. Cut from the cob without precooking. Add half as much boiling water as corn by weight, heat to boiling, add 1 teaspoon of salt and 2 teaspoons of sugar to each quart, and fill boiling hot into containers. Process immediately at 15 pounds pressure, or 250° F., quart glass jars for 80 minutes, pint glass jars for 75 minutes, and No. 2 C enameled tin cans for 70 minutes. Corn should not be canned in No. 3 tin cans because of the difficulty of heat penetration.

Greens, including spinach.—Pick over the greens, discarding any imperfect leaves and tough, fibrous stems. Wash carefully in running water or through a number of waters, lifting the greens out each time. Steam or heat the greens in a covered vessel until completely wilted, adding in the latter case just enough water to prevent burning. Pack boiling hot into the containers, taking care that the material is not packed too solidly and that there is sufficient liquid to cover, adding boiling water if necessary. Add 1 teaspoon salt to each quart. Process immediately at 15 pounds pressure, or 250° F., quart glass jars for 65 minutes, pint glass jars for 60 minutes, and No. 2 tin cans for 55 minutes. Greens should not be canned in No. 3 tin cans, because of the difficulty of heat penetration.

Mushrooms.—Wash thoroughly, peel, and drop into water containing 1 tablespoon of vinegar per quart. Precook by placing in a wire sieve or colander, cover with a lid and immerse for three to four minutes in boiling water which contains 1 tablespoon of vinegar and 1 teaspoon of salt per quart. Fill into containers at once and cover with freshly boiling water. Add 1 teaspoon of salt to each quart. Process at 10 pounds pressure, or 240° F., quart glass jars for 35 minutes and pint glass jars and No. 2 and No. 3 tin cans for 25 minutes.

Okra.—Only young, tender pods should be canned. The older pods should be dried. After the pods are washed cover with water and bring to a boil.

Pack hot in the containers and add 1 teaspoon of salt to each quart. Process immediately at 10 pounds pressure, or 240° F., quart glass jars for 40 minutes, pint glass jars for 35 minutes, and No. 2 and No. 3 tin cans for 30 minutes.

Peas, green.—Use only young, tender peas. Shell, discarding any imperfect peas, and wash. Bring to boil in water to cover. Pack boiling hot into the containers, and add 1 teaspoon of salt to each quart. Process immediately at 10 pounds pressure, or 240° F., quart glass jars for 55 minutes, pint glass jars and No. 2 and No. 3 plain tin or C enameled tin cans for 45 minutes.

Peas, black-eyed.—Same as Lima beans.

Pumpkin.—Wash the pumpkin, cut into sections, peel and cut into 1 to 1½ inch cubes. Add a small quantity of water and simmer until heated through, stirring occasionally. Pack hot into containers, add 1 teaspoon of salt to each quart and cover with water in which cooked. Or if desired, cut pumpkin into sections and bake or steam until heated through. Remove from shell and fill into containers while hot. Add salt and boiling water to cover. Process immediately at 15 pounds pressure or 250° F., quart glass jars for 75 minutes, pint glass jars and No. 2 tin cans for 60 minutes and No. 3 cans for 70 minutes. If canning in tin use the sanitary or R enameled cans.

Squash.—Same as pumpkin.

Sweetpotatoes.—Where sweetpotatoes can be stored successfully, only enough should be canned to take care of the season during which the stored potatoes are not available. If in harvesting more are cut with the plow than can be used immediately, they may be canned in order to save them. In case they are canned at harvesting time it is important that the precooking be slow in order to develop the sugar in the sweetpotatoes.

Wash the sweetpotatoes thoroughly and boil or steam until the skins slip off readily. Peel quickly, cut into medium-sized sections, and pack hot into containers. Add immediately 1 teaspoon salt to each quart and enough boiling water to cover. Process at once at 10 pounds pressure or 240° F., quart glass jars for 120 minutes, pint glass jars and No. 2 tin cans for 95 minutes, and No. 3 tin cans for 115 minutes.

TIME-TABLE FOR CANNING NONACID VEGETABLES WITH THE PRESSURE CANNER

Pack vegetables as nearly boiling hot as possible, using additional boiling water if necessary to cover vegetable in the can. Add 1 teaspoon salt to a quart for all vegetables and 2 teaspoons sugar, if desired, to corn. Place jars or cans in hot canner as soon as they are filled.

Product	Method of treatment before processing	Processing period in pressure canner						
		Quart glass jars		Pint glass jars		No. 2 or No. 3 tin cans		
		Time in minutes	Pressure or temperature	Time in minutes	Pressure or temperature	Time in minutes	Pressure or temperature	Type of tin can
Asparagus	Tie in uniform bundles, place in saucepan with boiling water over lower tough portion, cover tightly, boil two to three minutes, and pack hot into containers. Or cut in half-inch lengths, bring to boil in water to cover, and pack hot into containers.	35	10 pounds or 240° F.	30	10 pounds or 240° F.	30	10 pounds or 240° F.	Plain tin.
Beans, string	Heat to boiling with water to cover. Pack hot into containers	35	do	30	do	30	do	Plain tin or C enamel.
Beans, Lima	Can only young and tender beans, using method suggested for peas	55	do	50	do	50	do	C enamel.
Baby beets	Can only young tender beets. Scald in boiling water or steam until the skins slip easily. Skin and pack hot into containers.	35	do	30	do	30	do	Sanitary enamel.
Corn	Cut off without precooking. Add half as much boiling water as corn by weight, heat to boiling, and pack hot into containers.	80	15 pounds or 250° F.	75	15 pounds or 250° F.	[1] 70	15 pounds or 250° F.	C enamel.
Greens, including spinach.	Steam or heat in covered vessel until completely wilted, using just enough water to prevent burning. Pack hot into containers, taking care that the material is not packed too solidly and that there is liquid to cover.	65	do	60	do	[1] 55	do	Plain tin.
Mushrooms	Peel, and drop into water containing 1 tablespoon of vinegar per quart. Precook by immersing three to four minutes in boiling water which contains 1 tablespoon vinegar and 1 teaspoon salt per quart. Fill in to containers at once and cover with freshly boiling water.	35	10 pounds or 240° F.	25	10 pounds or 240° F.	25	10 pounds or 240° F.	Do.
Okra	Can only young, tender pods. Cover with water and bring to boil. Pack hot into containers.	40	do	35	do	30	do	Do.
Peas, green	Use only tender young peas. Bring to boil with water to cover and pack hot into containers.	55	do	45	do	45	do	Plain tin or C enamel.
Peas, blackeyed	Same as Lima beans.							
Pumpkin	Cut into cubes. Add small quantity of water, bring to boil. Stir while heating through. Pack into hot containers.	75	15 pounds or 250° F.	60	15 pounds or 250° F.	No. 2, 60. No. 3, 70.	15 pounds or 250° F.	Sanitary enamel.
Squash	Same as pumpkin.							
Sweetpotatoes	Boil or steam until skins slip off readily. Peel quickly and pack hot into containers.	120	10 pounds or 240° F.	95	10 pounds or 240° F.	No. 2, 95. No. 3, 115.	10 pounds or 240° F.	Plain tin.

[1] Should not be canned in No. 3 cans because of difficulty of heat penetration.

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